

AMERICAN FORK CITY GENERAL PLAN



Public Facilities and Services Element

DRAFT 2016 Pressurized Irrigation System Master Plan & Impact Fee Facility Plan

Prepared by

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ENGINEERS

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Abbreviations

AAPR	Annual Percentage Growth Rate
CCI	Construction Cost Index
ERC	Equivalent Residential Connection
DDW	Division of Drinking Water
fps	Feet per Second
gpd	Gallons per Day
gpdpc	Gallons per Day per Capita
gpm	Gallons per Minute
IFA	Impact Fee Analysis
IFFP	Impact Fee Facility Plan
sf	Square Foot

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Chapter 1 - Summary and Recommendations

Introduction

American Fork City has been experiencing significant population growth over the past several years, with many new subdivisions having been built and large blocks of land having been annexed into the City. The City continues to prepare for additional population growth, especially in areas south of Interstate 15 such as the proposed Transit Oriented Development (TOD) area. Due to these factors, it is necessary to review and update the American Fork City Water Systems component of the General Plan to help the City prepare for growth and to correct water system deficiencies.

Horrocks Engineers prepared the American Fork City Water Systems component of the General Plan in 1993, which was subsequently updated in 1998. An additional section was added to the water systems component of the General Plan in 2003, which was then updated in both 2007 and 2010 to include the proposed secondary water system, hereafter referred to as the pressurized irrigation system. Since completion of construction of the pressurized irrigation system in 2010, demands on the culinary water system have been significantly reduced and overall water service to City residents has improved. The pressurized irrigation and culinary water systems generally operate independent of each other. As such, the American Fork City Water Systems component of the General Plan will now be separated into the Culinary Water and Pressurized Irrigation System master plans.

Most of the recommendations in the previous components have been completed. This 2016 Pressurized Irrigation System master plan update addresses the changes since 2010. This study was performed assuming the city-wide pressurized irrigation system will supply the majority of outdoor water demand.

American Fork City's current and future conditions are discussed in this study, including the existing land use and zoning, projected population, number of connections, developable areas, and projected demand. Using the projected population, design requirements, and historical demand, required system capacity is projected through the planning period.

To develop an impact fee, a minimum level of service must be established. The following is the minimum level of service (LOS) to be provided by the Pressurized Irrigation system.

- Provide 40 psi at all locations in the distribution system during peak day demands
- Provide 30 psi at all locations in the distribution system during peak hour demands
- Maintain a maximum 8 fps water velocity during peak hour demands

- Maintain a maximum 5 fps water velocity during peak day demands unless pressures are not compromised.
- Maintain a minimum of 2,254 gallons of storage per acre
- Maintain a minimum of 4.0 ac-ft of water right per acre
- Maintain a minimum of 7.05 gpm of water source per acre

A computer program was used to analyze the existing water systems to determine if the LOS minimum could be met. The capital improvements required to bring the existing water system up to the minimum LOS were also determined. In addition, recommendations for improvements were made to meet future demand.

The feasibility of the recommended improvements depends on the available funding. Recommendations are made to provide the funding needed to implement the recommended capital improvements.

Projected Population

American Fork City's population as of 2014 was 28,152 people. However, the City's population is projected to increase by 206 percent to 86,192 people at build out conditions by the year 2060. This growth will add an additional 1,701 irrigated acres to the system.

Projected Water Demand

Calculations in this report assume that the culinary water system is used most for indoor water use and the pressurized irrigation system is used for most outdoor water use. It is also assumed that all residents connected to the secondary irrigation system use the system for their outdoor watering needs.

The State of Utah Division of Drinking Water requires a culinary public water system to provide 3.39 gpm per irrigated acre in this part of the State. American Fork's pressurized irrigation system was originally designed to handle 7.05 gpm per irrigated acre. All modeling and planning for future construction is based on this minimum level of service. Conservation measures will need to be implemented to meet this target both now and in the future to ensure that American Fork's pressurized irrigation system can handle the current usage rates without having compromising service in some areas.

Recommended Pressurized Irrigation System Improvements

These recommendations were determined by using a computer model of American Fork City's pressurized Irrigation system and input from city staff.

Existing Deficiency Improvement Plan

American Fork City's current pressurized irrigation system delivers pressurized irrigation water throughout the City. The pressurized irrigation system is performing as planned since completion of construction in 2010, overall water service to City residents has improved, and no existing deficiencies have been noted. As such, no improvements are required for the existing pressurized irrigation system.

Though not an identified deficiency in the existing pressurized irrigation system, the City has elected to replace the Upper Filter Station in order to improve operational efficiencies. Table 1 shows the improvements to the existing system.

Table 1 Existing Improvements

Item	Description	Cost	Existing	Growth
1	Upper Filter Station Replacement	\$1,031,625	\$573,335	\$458,290.45
Grand Total		\$1,031,625	\$573,335	\$458,290

Mar 2016 CCI = 10242

Costs are in 2016 dollars

Buildout Improvement Plan

Table 2 shows the improvements necessary to provide capacity for future growth. These improvements are shown in Figure 2 in the appendix.

Table 2 Buildout Improvements

Item	Description	Cost
1	5300 West Distribution Line	\$250,869
2	740 East and 400 South Distribution Lines	\$231,050
3	State Street and 340 South Distribution Lines	\$234,423
4	Southern Well #1 Connection to PI System	\$2,475,289
5	860 East Northern Distribution Line	\$222,365
6	860 East Southern Distribution Line	\$209,338
7	5750 West Distribution Line	\$238,070
8	200 South Distribution Line	\$285,846
9	Spring Creek Connection to PI System	\$502,616
10	1500 South Distribution Line	\$187,683
11	Combined Distribution Line Projects	\$10,656,504
12	Mitchell Hollow Connection to PI System	\$491,160
13	Mill Lane Connection to PI System	\$1,061,959
14	6th East Well Connection to PI System	\$2,429,449
15	Southern Well #2 Connection to PI System	\$2,444,729
16	Southern Well #3 Connection to PI System	\$2,497,341
Grand Total		\$24,418,691

Mar 2016 CCI = 10242

Costs are in 2016 dollars

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Chapter 2 - Current and Future Conditions

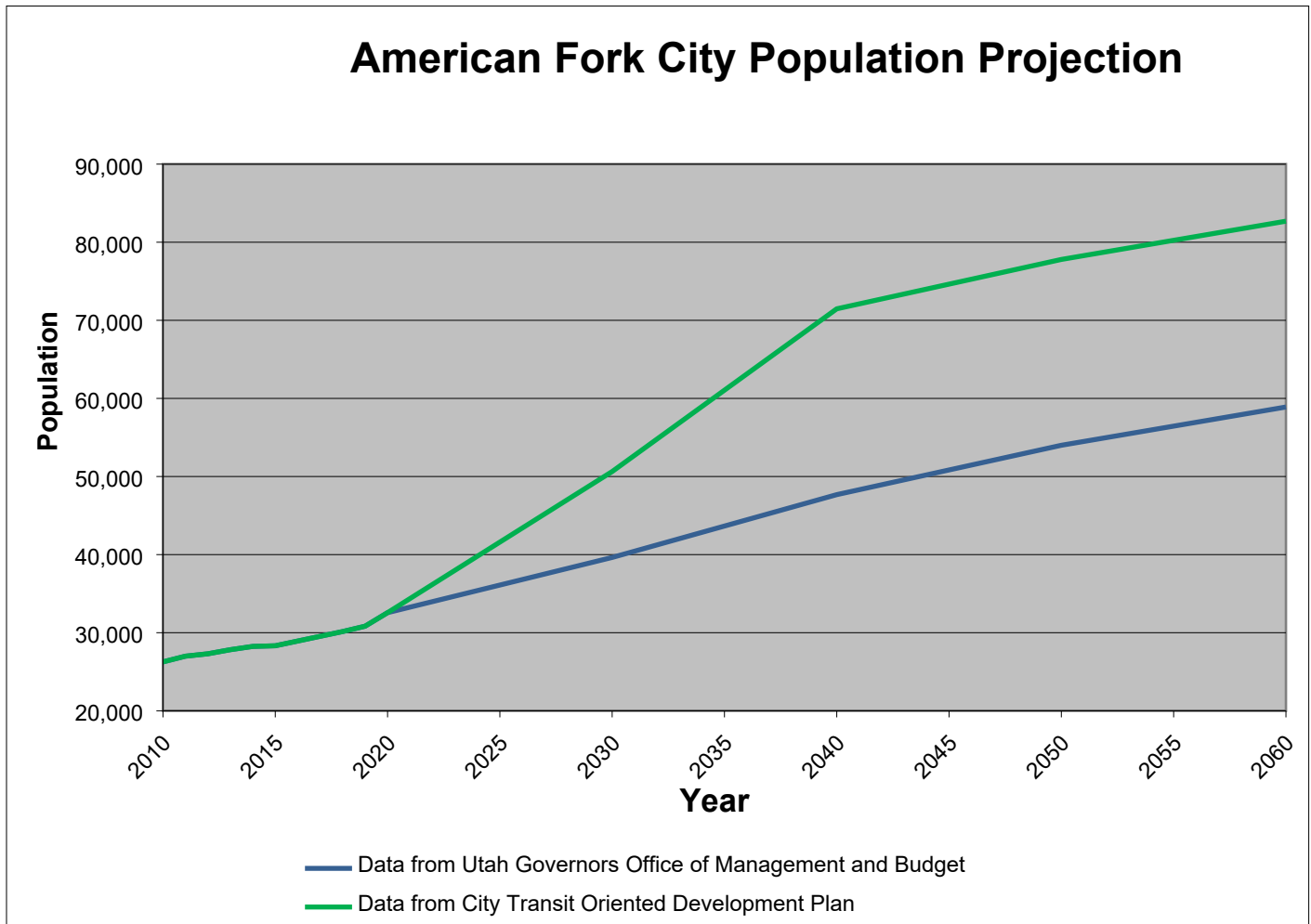
Future conditions in American Fork City will affect the pressurized irrigation demands and the improvements needed to meet these demands. As factors change, the projected future conditions made in this study could be affected. To help minimize the effect of the changing future conditions, the recommendations made in this study have been based upon the acres irrigated by American Fork City's pressurized irrigation system rather than time periods.

This chapter discusses American Fork City's population projections through the planning and ultimate build-out periods. The projected number of irrigated acres has been determined based upon the projected population. In addition, using the potential areas of development, historical water demands, and selected LOS, the pressurized irrigation demands projected through the planning and ultimate build-out periods are discussed.

Projected Population

Population projections have been determined for American Fork City by Mountainland Association of Governments (MAG) in ten (10) year increments until total build-out is reached near the year 2060. However, the MAG population projections do not take into account the Transit Oriented Development (TOD) area located south of Interstate 15. Additional “high density” population projections have been determined by InterPlan in ten (10) year increments that take the TOD development into account. Intermediate numbers for both the MAG and InterPlan population projections were calculated by interpolation and are shown in Table 4. American Fork City's projected population is also shown on Figure 1. The projected annual percentage growth rate (AAPR) from 2014 to 2060 is approximately 2.45 percent. Figures 3 and 4 in the appendix show the current zoning and land use within American Fork City.

Figure 1 Population Projections



Irrigated Acreage

Pressurized irrigation demands are generated from land use within the City. Residential irrigation demand is based on the zoning while commercial, industrial, and institutional are based on a typical average. Table 3 below shows the percentage of each parcel that is assumed irrigated for modeling and planning purposes. Values were determined by measuring a representative sample of each land use and typical values seen in surrounding communities.

Table 3 Irrigated Acreage by Land Use

Zoning or Land Use	Percent of Lot Irrigated	Typical Irrigated Acres
Design Commercial	17-24%	Site Specific
Design Industrial	11.00%	Site Specific
General Commercial	17.00%	Site Specific
Neighborhood Commercial	17.00%	Site Specific
Planned Community	32.00%	Site Specific
Professional Office	17.00%	Site Specific
Resort	56.00%	Site Specific
Shoreline Protection	56.00%	Site Specific
TOD	11-24%	Site Specific
Residential High Density	52.00%	0.24
Residential Low Density	63.00%	0.22
Residential Medium Density	56.00%	0.15
Residential Very Low Density	66.00%	0.15
Parks	95.00%	Site Specific
Schools	50.00%	Site Specific
Churches	30.00%	Site Specific

Irrigated acreage is anticipated to grow at the same rate as population. Table 4 also shows the projected growth in irrigated acreage.

Table 4 Population and Irrigated Acreage Projections

Year	Population	Growth Rate	Acres
2015	28,326	0.29%	2,128
2016	28,933	2.14%	2,154
2017	29,540	2.10%	2,179
2018	30,147	2.05%	2,204
2019	30,832	2.27%	2,232
2020	32,566	5.62%	2,302
2025	41,601	2.00%	2,645
2030	50,635	1.82%	2,955
2035	61,054	1.88%	3,284
2040	71,472	1.72%	3,589
2045	74,633	1.26%	3,678
2050	77,794	1.18%	3,764
2055	80,244	0.88%	3,830
2060	82,694	0.84%	3,829

Existing Pressurized Irrigation System

The existing American Fork City pressurized irrigation system includes sources, storage, water rights, and distribution piping. The following sections describe the existing pressurized irrigation system components.

Pressurized Irrigation Sources

Table 5 shows the City existing pressurized irrigation sources and their capacity. Table 6 shows the current need versus supply. American Fork City currently has excess pressurized irrigation sources.

Table 5 Existing Pressurized Irrigation Sources

Water Source	Drought Year Flowrate Capacity (gpm)	Pressure Zone
Alpine Aqueduct	7,800	Upper Zone
American Fork River	1,651	Upper Zone
Culinary System Surplus	3,000	Upper Zone
Kelly Pasture Springs	535	Lower Zone
Murdock Canal	2,300	Lower Zone
Totals	15,286	

Table 6 Pressurized Irrigation Source Need Versus Supply

	Projected Need (gpm)	Potential Supply (gpm)	Excess/(Deficit)
Current	14,981	15,286	305

Pressurized Irrigation Storage

Table 7 shows the City’s existing pressurized irrigation storage facilities and their capacity. Table 8 shows the current need versus supply. American Fork City currently has excess pressurized irrigation storage.

Table 7 Existing Pressurized Irrigation Storage

Tank	Capacity (gallons)	Zone
Upper Reservoir	4,887,432	Upper Zone
Lower Reservoir	8,145,720	Lower Zone
Total	13,033,152	

Table 8 Pressurized Irrigation Storage Need Versus Supply

	Projected Need (gallons)	Potential Supply (gallons)	Excess/(Deficit)
Current	4,795,661	13,033,152	8,237,491

Pressurized Irrigation Rights

Table 9 shows the City’s existing pressurized irrigation water rights and or irrigation company shares and their drought year capacity. Table 10 shows the current need versus supply. American Fork City currently has adequate pressurized irrigation water rights.

Table 9 Existing Water Rights

Water Source	Drought Year Capacity (ac-ft)	Pressure Zone
American Fork Irrigation Company Shares	3,955	Upper Zone
Central Utah Project Water	2,095	Upper Zone
Highland Conservancy District Shares	600	Lower Zone
Provo River Water Users Association Shares	270	Lower Zone
American Fork City Misc Water Rights	200	Multiple
American Fork City Culinary Overflow Water Rights	2,000	Multiple
Totals	9,120	

Table 10 Pressurized Irrigation Water Right Need Versus Supply

	Projected Need (gpm)	Potential Supply (gpm)	Excess/(Deficit)
Current	8,512	9,120	608

Pressurized Irrigation Distribution Piping

Figure 5 in the appendix shows the City's existing distribution system including piping, sources, storage, etc. Figure 6 shows the pressure zones within the pressurized irrigation system.

Projected Pressurized Irrigation System Requirements

The projected population and LOS requirements were used to project the pressurized irrigation needs through the planning period. Using the projected ERCs, Table 11 shows the projected source, storage, and water right needs through the planning period.

Table 11 Projected Pressurized Irrigation Needs

Year	Acres	Flow Required (gpm)	Storage Volume Required (gallons)	Water Rights Required (ac-ft)
2015	2,128	14,981	4,795,661	8,512
2016	2,154	15,161	4,853,210	8,614
2020	2,302	16,208	5,188,344	9,209
2025	2,645	18,617	5,959,669	10,578
2030	2,955	20,803	6,659,327	11,820
2035	3,284	23,121	7,401,349	13,137
2040	3,589	25,269	8,089,002	14,357
2045	3,678	25,890	8,287,817	14,710
2050	3,764	26,500	8,482,953	15,057
2055	3,830	26,965	8,631,744	15,321
Buildout	3,829	26,956	8,629,034	15,316

Buildout Pressurized Irrigation Sources

Table 12 shows the anticipated sources at buildout. Table 13 shows the buildout need versus supply. It is projected that American Fork City will have adequate pressurized irrigation sources at buildout.

Table 12 Anticipated Sources at Buildout

Water Source	Drought Year Flowrate Capacity (gpm)	Pressure Zone
Alpine Aqueduct	7,800	Upper Zone
American Fork River	2,840	Upper Zone
Culinary System Surplus	0	Upper Zone
Kelly Pasture Springs	535	Lower Zone
Murdock Canal	2,300	Lower Zone
Mitchell Hollow	450	Lower Zone
Mill Lane Well	2,500	Lower Zone
Spring Creek	900	Lower Zone
6th East Well	2,150	Lower Zone
Southern Wells (3)	7,500	Lower Zone
Totals	26,975	

Table 13 Buildout Source Needs Versus Supply

	Projected Need (gpm)	Potential Supply (gpm)	Excess/(Deficit)
Buildout	26,956	26,975	19

Buildout Pressurized Irrigation Storage

Table 14 shows the anticipated storage facilities at buildout. Table 15 shows the buildout need versus supply. It is projected that American Fork City will have adequate pressurized irrigation storage at buildout.

Table 14 Anticipated Storage at Buildout

Tank	Capacity (gallons)	Zone
Upper Reservoir	4,887,432	Upper Zone
Lower Reservoir	8,145,720	Lower Zone
Total	13,033,152	

Table 15 Buildout Storage Needs Versus Supply

	Projected Need (gallons)	Potential Supply (gallons)	Excess/(Deficit)
Buildout	8,629,034	13,033,152	4,404,118

Buildout Pressurized Irrigation Rights

Table 16 shows the anticipated water rights at buildout. Table 17 shows the buildout need versus supply. It is projected that American Fork City will have adequate pressurized irrigation storage at buildout as developers are required to dedicate water rights to the City as a condition of development.

Table 16 Anticipated Water Rights at Buildout

Water Source	Drought Year Capacity (ac-ft)	Pressure Zone
American Fork Irrigation Company Shares	6,805	Upper Zone
Central Utah Project Water	2,095	Upper Zone
Highland Conservancy District Shares	600	Lower Zone
Provo River Water Users Association Shares	270	Lower Zone
American Fork City Water Rights	1,500	Multiple
American Fork City Culinary Overflow Water Rights	2,000	Multiple
Future Wells	7,500	Mill Ditch
TSSD Recycled Water	5,000	Aqueduct Low
Totals	25,770	

Table 17 Buildout Water Right Need Versus Supply

	Projected Need (gpm)	Potential Supply (gpm)	Excess/(Deficit)
Buildout	15,316	25,770	10,454

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Chapter 3 – Pressurized Irrigation System Analysis

American Fork City's pressurized irrigation system was analyzed to find the capacity of the current system and to determine the improvements needed to meet the demands of the projected population. In this chapter, a description of the existing pressurized irrigation system is given along with a discussion of the concerns and recommended improvements. State and American Fork City standard requirements were used as criteria to analyze the pressurized irrigation system. Information obtained from a computer model of American Fork's pressurized irrigation system is presented with the recommended improvements needed to meet the projected pressurized irrigation demand.

American Fork City currently has approximately 110 miles of pressurized irrigation pipelines that transmit and distribute pressurized irrigation throughout the City. Figure 5 in the appendix shows the existing pressurized irrigation system. Pipelines in the City range from 2 inches to 42 inches.

Design Standards

The State of Utah does not provide regulations for pressurized irrigation system design. It is recommended that American Fork City adopt the following criteria as the minimum level of service for the pressurized irrigation system:

To develop an impact fee, a minimum level of service must be established. The following is the minimum level of service to be provided by the pressurized irrigation system.

- Provide 40 psi at all locations in the distribution system during peak day demands
- Provide 30 psi at all locations in the distribution system during peak hour demands
- Maintain a maximum 8 fps water velocity during peak hour demands
- Maintain a maximum 5 fps water velocity during peak day demands unless pressures are not compromised.
- Maintain a minimum of 2,254 gallons of storage per acre
- Maintain a minimum of 4.0 ac-ft of water right per acre
- Maintain a minimum of 7.05 gpm of water source per acre

In addition to the minimum level of service criteria listed above the City has noted several operational concerns that should be addressed in the modeling planning for improvements. They are listed below.

1. Supply American Fork Canyon Water to the Lower Reservoir through the historical main ditch during high water periods.
2. Use this same ditch to provide water to Six Gates turnout into Highland during high water periods.
3. Provide water to Developmental Center through the traditional ditch during high water rather than the piped turnout.
4. Encourage flood irrigators to switch to pressurized service.
5. Encourage Six Gates users to connect to Highland pressurized irrigation system.
6. Encourage Mitchell Hollow users to connect to other pressurized irrigation systems.
7. Collect City owned Mitchell Hollow water shares into the pressurized irrigation system via booster pump.
8. Utilize Provo Reservoir Water Users Company flow rights throughout the irrigation season.
9. Rent Developmental Center water.
10. Schedule flood irrigation turns to limit number of flood ditches operating at the same time or during times of high pressurized system usage.
11. Decrease water available to flood irrigators as American Fork Canyon water decreases.
12. Reserve storage water for late season use or bank for future years (CUP, Deer Creek).
13. Charge system in spring with wells to minimize contamination.
14. Meeting regularly with the irrigation company to schedule irrigation turns and other coordination.
15. Only allow flood irrigation for those who requested it at the start of the system and limit the ability to go back to flood service if they discontinue service for a period of time.
16. Do not allow dual flood irrigation and pressurized irrigation service on an individual property.
17. Eventually install water meters and charge based on usage.
18. Institute odd/even watering schedules as necessary for conservation.
19. Limit culinary well usage as much as possible.
20. Evaluate piping of Main Ditch from the mouth of American Fork Canyon to the lower reservoir.
21. Participate in the reconstruction of the main irrigation diversion at the mouth of American Fork Canyon.
22. Install telemetry at splitter structure and upper reservoir screening structure to monitor flows remotely.

Computer Model of Pressurized Irrigation System

A computer program called *WaterGEMS V8i* (SELECT series 6) was used to model American Fork City's pressurized irrigation system. The program uses the flows demanded at each node to calculate the pressures, flows, and velocity of flow for each node and pipe. Output of the model includes, pipe velocity, node demands, pressures, and available fire flow. Information for the existing pressurized irrigation system includes the pipe diameters, lengths, tanks, sources, pumps, PRV stations, etc.

Several different scenarios were modeled to determine the necessary improvements. First both peak day and peak hour modeling are performed to ensure the minimum levels of service are met. Second both wet year and dry year conditions were modeled. Wet year modeling utilized local high surface water flows first prior to utilizing the wells while dry year modeling utilizes wells with the minimum expected surface water flows. There could be any number of wet year/dry year conditions in any given year. Peak day/peak hour and wet

year/dry year conditions were analyzed in both the current conditions and projected buildout conditions. In addition an extended period simulation was set up in both the wet year and dry year conditions where demands varied during the day. This analysis was performed to determine if sources and storage were balanced over an extended period.

Water usage and supply conditions are very seldom the same from day to day or from year to year and it is not possible to model the complete range of conditions that may apply. The intent of this analysis is to provide the City with recommendations that, if implemented, will provide flexibility in operation to meet the myriad of operational conditions that will exist.

The number of irrigated acreage was estimated based on build-out conditions with the 2015 zoning and assuming 20 percent of the area was used in the development of roadways, sidewalks, parks, etc. The flows generated by the number of irrigated acreage achieved at build-out were entered into *WaterGEMS*. *WaterGEMS* was run to determine upgrades needed for demands on the existing pressurized irrigation system and demands to be placed on the system during buildout.

Existing Deficiency Improvement Plan

American Fork City's current pressurized irrigation system delivers pressurized irrigation water throughout the City. The pressurized irrigation system is performing as planned since completion of construction in 2010, overall water service to City residents has improved, and no existing deficiencies have been noted. As such, no improvements are required for the existing pressurized irrigation system. Figures 7 and 8 in the appendix show the existing peak day pressure and velocity respectively.

Though not an identified deficiency in the existing pressurized irrigation system, the City has elected to replace the Upper Filter Station in order to improve operational efficiencies. Table 18 shows the improvements to the existing system.

Table 18 Existing Improvements

Item	Description	Cost	Existing	Growth
1	Upper Filter Station Replacement	\$1,031,625	\$573,335	\$458,290.45
Grand Total		\$1,031,625	\$573,335	\$458,290

Mar 2016 CCI = 10242
Costs are in 2016 dollars

Buildout Improvement Plan

Table 19 shows the improvements necessary to provide capacity for future growth. These improvements are shown in Figure 2 in the appendix. Figure 9 in the appendix shows the proposed buildout water system.

Figures 10 and 11 in the appendix show the projected peak hour pressure and velocity respectively at buildout.

Table 19 Buildout Improvements

Item	Description	Cost
1	5300 West Distribution Line	\$250,869
2	740 East and 400 South Distribution Lines	\$231,050
3	State Street and 340 South Distribution Lines	\$234,423
4	Southern Well #1 Connection to PI System	\$2,475,289
5	860 East Northern Distribution Line	\$222,365
6	860 East Southern Distribution Line	\$209,338
7	5750 West Distribution Line	\$238,070
8	200 South Distribution Line	\$285,846
9	Spring Creek Connection to PI System	\$502,616
10	1500 South Distribution Line	\$187,683
11	Combined Distribution Line Projects	\$10,656,504
12	Mitchell Hollow Connection to PI System	\$491,160
13	Mill Lane Connection to PI System	\$1,061,959
14	6th East Well Connection to PI System	\$2,429,449
15	Southern Well #2 Connection to PI System	\$2,444,729
16	Southern Well #3 Connection to PI System	\$2,497,341
Grand Total		\$24,418,691
Mar 2016 CCI = 10242		
Costs are in 2016 dollars		

A summary of the recommended improvements, scheduling, and estimated costs is shown in Table 20. Figure 2 in the appendix shows the recommended improvements. With contingencies, engineering, legal, and administrative fees, the total estimated cost is \$18,177,563.

Table 20 Full Improvement Schedule

Fiscal Year	Description	Cost	% Benefit to Existing	Impact Expense	Operating Expense
2016-17	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	5300 West Distribution Line	\$250,869	0.00%	\$250,869	\$0
	Upper Filter Station Replacement	\$1,031,625	55.58%	\$458,290	\$573,335
2017-18	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	740 East and 400 South Distribution Lines	\$231,050	0.00%	\$231,050	\$0

2018-19	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	State Street and 340 South Distribution Lines	\$234,423	0.00%	\$234,423	\$0
2019-20	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Southern Well #1 Connection to PI System	\$2,475,289	0.00%	\$2,475,289	\$0
2020-21	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	860 East Northern Distribution Line	\$222,365	0.00%	\$222,365	\$0
2021-22	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	860 East Southern Distribution Line	\$209,338	0.00%	\$209,338	\$0
2022-23	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	5750 West Distribution Line	\$238,070	0.00%	\$238,070	\$0
2023-24	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	200 South Distribution Line	\$285,846	0.00%	\$285,846	\$0
2024-25	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Spring Creek Connection to PI System	\$502,616	0.00%	\$502,616	\$0
2025-26	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	1500 South Distribution Line	\$187,683	0.00%	\$187,683	\$0
2026-27	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2027-28	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2028-29	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2029-30	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2030-31	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	Mitchell Hollow Connection to PI System	\$367,466	0.00%	\$367,466	\$0
2031-32	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2032-33	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2033-34	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2034-35	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2035-36	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	Mill Lane Connection to PI System	\$367,466	0.00%	\$367,466	\$0
2036-37	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2037-38	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2038-39	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2039-40	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223

	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2040-41	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	6th East Well Connection to PI System	\$367,466	0.00%	\$367,466	\$0
2041-42	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2042-43	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2043-44	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2044-45	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2045-46	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	Southern Well #2 Connection to PI System	\$367,466	0.00%	\$367,466	\$0
2046-47	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2047-48	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2048-49	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2049-50	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2050-51	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	Southern Well #3 Connection to PI System	\$367,466	0.00%	\$367,466	\$0
2051-52	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2052-53	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2053-54	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2054-55	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2055-56	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2056-57	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2057-58	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2058-59	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
2059-60	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Combined Distribution Line Projects	\$367,466	0.00%	\$367,466	\$0
Total Expenditures		\$18,459,541		\$17,628,334	\$831,207

S E C T I O N

4

Chapter 4 - Impact Fee Facility Plan (IFFP)

General Background

American Fork City has experienced significant growth in recent years. This growth, through the construction of homes, parks, commercial areas, and other amenities incidental to development, has added to the load on the City's pressurized irrigation system. As development continues, additional demands will be placed on the pressurized irrigation system. American Fork City's objective is to provide adequate pressurized irrigation facilities to meet the drinking water and fire protection needs of the residents.

American Fork City adopted a Water Systems component of the General Plan in 1993, which was subsequently updated in 1998. An additional section was added to the water systems component of the General Plan in 2003, which was then updated in both 2007 and 2010 to include the proposed secondary water system. The pressurized irrigation and culinary water systems generally operate independent of each other. As such, the American Fork City Water Systems component of the General Plan will now be separated into the Culinary Water and Pressurized Irrigation System master plans. The master plan update for the culinary water facilities is being completed concurrent with this master plan update. This plan proposes guidelines and suggests controls for the design and installation of pressurized irrigation facilities. The plan also establishes estimated costs associated with pressurized irrigation facilities.

Required Elements of an IFFP

The purpose of this IFFP is to identify pressurized irrigation demands placed on existing pressurized irrigation facilities by new development and propose means by which American Fork City will meet these demands. Various funding possibilities for these facilities will also be discussed.

An IFFP, or its equivalent, must be in place if impact fees are to be considered as a financing source. Impact fees are one-time fees charged to new development to cover costs of increased capital facilities necessitated by new development. They are a critical financing source for American Fork City to consider, given the growth occurring in American Fork City.

According to Utah Code Title 11 Chapter 36a, known as the Impact Fee Act, local political subdivisions with a population of 5,000 or greater must prepare a separate IFFP before imposing impact fees unless the requirements of Utah Code Ann. §11-36-301 (3) (a) are included as part of the General Plan. Because the American Fork City General Plan does not satisfy these requirements, this IFFP has been prepared to meet the legal requirement.

Utah Code Ann. §11-36a-302 provides that the plan shall identify:

- (i) Demands placed upon existing public facilities by new development activity; and
- (ii) The proposed means by which the local political subdivision will meet those demands.

Demands on Existing Facilities

Service Area

American Fork City is located in the northern most portion of Utah County near the base of the Wasatch Mountains and includes an area of approximately 9.4 square miles. It is bordered on the North by Highland and Cedar Hills, on the South by Utah Lake, on the East by Pleasant Grove and Lindon, and on the West by Lehi. Existing land uses vary from pasture and farmland to high-density residential housing and commercial complexes. Therefore, the community can be classified as both rural and suburban.

American Fork City owns and operates a pressurized irrigation system that delivers pressurized irrigation water. The existing system can be seen in Figure 5 in the appendix

Pressurized Irrigation Design Requirements

The following is the minimum level of service to be provided by the pressurized irrigation system in accordance with Utah Code Annotated, 11-36a-302(1)(a)(i) and (ii).

- Provide 40 psi at all locations in the distribution system during peak day demands
- Provide 30 psi at all locations in the distribution system during peak hour demands
- Maintain a maximum 8 fps water velocity during peak hour demands
- Maintain a maximum 5 fps water velocity during peak day demands unless pressures are not compromised.
- Maintain a minimum of 2,254 gallons of storage per acre
- Maintain a minimum of 4.0 ac-ft of water right per acre
- Maintain a minimum of 7.05 gpm of water source per acre

Existing Pressurized Irrigation Facilities

Existing conditions at the time of this study were established using data collected from the City. Some of the data gathered and used includes an existing pressurized irrigation model, the existing water master plan, existing City maps, and field flow data. Figure 5 in the appendix shows American Fork's existing pressurized irrigation system and facilities.

Connections to the pressurized irrigation system include residential, school, church, commercial, and City owned facility connections for a total of 2,128 acres.

Existing Pressurized Irrigation Source

Tables 21 and 22 describe the City's existing water sources and requirements.

Table 21 Existing Pressurized Irrigation Source Capacity

Water Source	Drought Year Flowrate Capacity (gpm)	Pressure Zone
Alpine Aqueduct	7,800	Upper Zone
American Fork River	1,651	Upper Zone
Culinary System Surplus	3,000	Upper Zone
Kelly Pasture Springs	535	Lower Zone
Murdock Canal	2,300	Lower Zone
Totals	15,286	

Table 22 Existing Pressurized Irrigation Source Available

	Projected Need (gpm)	Potential Supply (gpm)	Excess/(Deficit)
Current	14,981	15,286	305

American Fork City needs to meet the following criteria with regards to water source.

- Provide 7.05 gpm per irrigated acre

American Fork City currently has excess source capacity.

Existing Pressurized Irrigation Storage

Tables 23 and 24 describe the City's existing water storage facilities and requirements.

Table 23 Existing Pressurized Irrigation Storage Capacity

Tank	Capacity (gallons)	Zone
Upper Reservoir	4,887,432	Upper Zone
Lower Reservoir	8,145,720	Lower Zone
Total	13,033,152	

Table 24 Existing Pressurized Irrigation Storage Available

	Projected Need (gallons)	Potential Supply (gallons)	Excess/(Deficit)
Current	4,795,661	13,033,152	8,237,491

American Fork City needs to meet the following criteria with regards to water storage.

- Provide 2,254 gallons of storage per irrigated acre

American Fork currently has excess storage capacity.

Existing Pressurized Irrigation Rights

Tables 25 and 26 describe the City's existing water rights and requirements.

Table 25 Existing Pressurized Irrigation Water Rights

Water Source	Drought Year Capacity (ac-ft)	Pressure Zone
American Fork Irrigation Company Shares	3,955	Upper Zone
Central Utah Project Water	2,095	Upper Zone
Highland Conservancy District Shares	600	Lower Zone
Provo River Water Users Association Shares	270	Lower Zone
American Fork City Misc Water Rights	200	Multiple
American Fork City Culinary Overflow Water Rights	2,000	Multiple
Totals	9,120	

Table 26 Existing Pressurized Irrigation Water Rights Available

	Projected Need (gpm)	Potential Supply (gpm)	Excess/(Deficit)
Current	8,512	9,120	608

American Fork City needs to meet the following criteria with regards to water rights.

- Provide 4.0 ac-ft of water right per irrigated acre

American Fork City currently has excess pressurized irrigation water right capacity.

Existing Distribution System

American Fork City has set the following minimum LOS standards with regards to its pressurized irrigation distribution system.

- Provide a minimum of 40 psi at all points in the distribution system during peak day demands
- Provide a minimum of 30 psi at all points in the distribution system during peak hour demands
- Maintain a maximum 8 fps water velocity during peak hour demands
- Maintain a maximum 5 fps water velocity during peak day demands unless pressures are not compromised.

For the most part American Fork City's existing pressurized irrigation system meets these criteria.

Deficiencies Based on Existing Development

The following deficiencies are identified in accordance with Utah Code Annotated, 11-36a-302(1)(a)(iv). American Fork City's current pressurized irrigation system delivers pressurized irrigation water throughout the City. The pressurized irrigation system is performing as planned since completion of construction in 2010, overall water service to City residents has improved, and no deficiencies based on existing development have been noted. As such, no improvements are required for the existing pressurized irrigation system.

Future Demand and Capital Facilities

The following sections identify the future infrastructure required to meet the demand of new development in accordance with Utah Code Annotated, 11-36a-302(1)(a)(v).

Future Pressurized Irrigation Requirements

The same design requirements for the current system will apply for future development. All new development will be required to install a minimum of 6-inch pressurized irrigation lines (4 inch in some cul-de-sacs) or the appropriate size to serve their development, whichever is larger.

Future Capital Pressurized Irrigation Facilities

Future conditions at the time of this study were established using data collected from the City. A buildout pressurized irrigation model was created with the projected pressurized irrigation system using the buildout number of irrigated acres. Figure 9 in the appendix shows American Fork's buildout pressurized irrigation

system and facilities.

Future Pressurized Irrigation Source

American Fork City currently has approximately 21,750 gpm of pressurized irrigation source capacity. Analyzing a total buildout scenario, it is projected that the City will need approximately 26,956 gpm pressurized irrigation capacity. Table 27 shows American Fork's existing water sources that could be used to meet future needs. Table 28 gives the projected excess and deficits. American Fork City has excess source capacity for buildout.

Table 27 Buildout Pressurized Irrigation Source Capacity

Water Source	Drought Year Flowrate Capacity (gpm)	Pressure Zone
Alpine Aqueduct	7,800	Upper Zone
American Fork River	2,840	Upper Zone
Culinary System Surplus	0	Upper Zone
Kelly Pasture Springs	535	Lower Zone
Murdock Canal	2,300	Lower Zone
Mitchell Hollow	450	Lower Zone
Mill Lane Well	2,500	Lower Zone
Spring Creek	900	Lower Zone
6th East Well	2,150	Lower Zone
Southern Wells (3)	7,500	Lower Zone
Totals	26,975	

Table 28 Buildout Pressurized Irrigation Source Available

	Projected Need (gpm)	Potential Supply (gpm)	Excess/(Deficit)
Buildout	26,956	26,975	19

Future Pressurized Irrigation Storage

American Fork City currently has approximately 13,033,152 gallons of pressurized irrigation storage capacity. Analyzing a total buildout scenario, it is projected that the City will need approximately 8,629,034 gallons of

pressurized irrigation storage capacity. Table 29 shows American Fork’s existing pressurized irrigation storage that could be used to meet future needs. Table 30 gives the projected excess and deficits. American Fork City has excess pressurized irrigation storage capacity for buildout.

Table 29 Buildout Pressurized Irrigation Storage Capacity

Tank	Capacity (gallons)	Zone
Upper Reservoir	4,887,432	Upper Zone
Lower Reservoir	8,145,720	Lower Zone
Total	13,033,152	

Table 30 Buildout Pressurized Irrigation Storage Available

	Projected Need (gallons)	Potential Supply (gallons)	Excess/(Deficit)
Buildout	8,629,034	13,033,152	4,404,118

Future Pressurized Irrigation Water Right Requirements

American Fork City currently has approximately 9,120 ac-ft of pressurized irrigation water right capacity. Analyzing a total buildout scenario, it is projected that the City will need approximately 15,316 ac-ft of pressurized irrigation water right capacity. Table 31 shows Pleasant Grove’s existing pressurized irrigation water rights that could be used to meet future needs. Table 32 gives the projected excess and deficits. American Fork City has excess pressurized irrigation water right capacity for buildout.

Table 31 Buildout Pressurized Irrigation Water Rights Capacity

Water Source	Drought Year Capacity (ac-ft)	Pressure Zone
American Fork Irrigation Company Shares	6,805	Upper Zone
Central Utah Project Water	2,095	Upper Zone
Highland Conservancy District Shares	600	Lower Zone
Provo River Water Users Association Shares	270	Lower Zone
American Fork City Water Rights	1,500	Multiple
American Fork City Culinary Overflow Water Rights	2,000	Multiple
Future Wells	7,500	Mill Ditch
TSSD Recycled Water	5,000	Aqueduct Low
Totals	25,770	

Table 32 Buildout Pressurized Irrigation Water Rights Available

	Projected Need (gpm)	Potential Supply (gpm)	Excess/(Deficit)
Buildout	15,316	25,770	10,454

Future Capital Facilities

Figure 9 shows the proposed pressurized irrigation system layout. Table 33 shows the improvements necessary for buildout. Table 34 shows the anticipated ten year improvement schedule with associated impact fee related costs.

Table 33 Buildout System Improvements

Item	Description	Cost
1	5300 West Distribution Line	\$250,869
2	740 East and 400 South Distribution Lines	\$231,050
3	State Street and 340 South Distribution Lines	\$234,423
4	Southern Well #1 Connection to PI System	\$2,475,289
5	860 East Northern Distribution Line	\$222,365
6	860 East Southern Distribution Line	\$209,338
7	5750 West Distribution Line	\$238,070
8	200 South Distribution Line	\$285,846
9	Spring Creek Connection to PI System	\$502,616
10	1500 South Distribution Line	\$187,683
11	Combined Distribution Line Projects	\$10,656,504
12	Mitchell Hollow Connection to PI System	\$491,160
13	Mill Lane Connection to PI System	\$1,061,959
14	6th East Well Connection to PI System	\$2,429,449
15	Southern Well #2 Connection to PI System	\$2,444,729
16	Southern Well #3 Connection to PI System	\$2,497,341
Grand Total		\$24,418,691

Mar 2016 CCI = 10242
Costs are in 2016 dollars

Buildout connections to the pressurized irrigation system include residential, school, church, commercial, and City owned facility connections for a total of 3,829 acres.

Capital Facility Cost and Proportionate Share

Cost of Capital Facilities

Detailed engineer's estimates of cost are included in the appendix. A summary of those costs are included in Table 20 previously. These costs are associated with master planned improvements in order to properly handle future development demands and are thus eligible for inclusion in an impact fee. Only that portion of the capital facilities that will benefit growth in the 10 year planning period are eligible for inclusion. An appropriate inflation factor can be incorporated in the analysis to cover rising costs in the future.

Cost of Master Planning

The City expects to expend money every year to review the pressurized irrigation master plan, IFFP, and IFA and every five years to fully update the same. These costs are eligible for inclusion in an impact fee. Only that portion of the master planning that will benefit growth in the 10 year planning period are eligible for inclusion. An appropriate inflation factor can be incorporated in the analysis to cover rising costs in the

future.

Value of Free Capacity in Pressurized Irrigation System

The existing pressurized irrigation system has excess capacity or free capacity available for future growth. The original system was designed and oversized to meet the demands of growth. It is acceptable for future users to pay for their portion of the existing system through an impact fee to reimburse existing users in accordance with Utah Code Annotated, 11-36a-302(1)(a)(iii). The free capacity portion of the impact fee can be utilized to repay the exiting pressurized irrigation enterprise account to recoup actual costs spent on the original system improvements. Only actual costs can be utilized in this analysis and not current replacement costs or inflation adjusted costs.

The pressurized irrigation system has approximately 63.2 percent excess storage capacity available for future growth. See Table 24. The pressurized irrigation system has approximately 2.0 percent excess source capacity available for future growth. See Table 22. The pressurized irrigation distribution system has approximately 100 percent excess capacity available for future growth. This is based upon an existing system pipe length of 713,474 feet of which 0 feet needs to be upgraded for future growth. All existing pipes have the necessary capacity for future growth. The original system was designed anticipating buildout growth.

Cost Associated with Existing Deficiencies

Existing deficiencies that are not associated with future connections cannot be included in an impact fee analysis (IFA). Some existing system deficiency improvements will serve the needs of buildout as well as cure an existing deficiency. These costs can be included in an IFA. As described previously, the existing pressurized irrigation system does not have any identified deficiencies. Therefore, no costs associated with existing deficiencies are identified for inclusion in the IFA.

Developer Contributions

As growth occurs throughout the City, developers are required to install minimum size pressurized irrigation lines to serve the homes within their development. Sometimes lines throughout the City need to be upsized to accommodate homes outside the development. The City collects impact fees from all development to cover the cost of upsizing. The detailed cost estimates prepared in the Master Plan only include those costs related to upsizing developer provided facilities or wholly City constructed facilities. No impact fees can be collected for developer provided facilities.

10 Year Improvement Schedule

Table 34 provides the anticipated schedule for master planning and improvement construction. The costs represent present value in 2016 dollars.

Table 34 10 Year Improvement Schedule

Fiscal Year	Description	Cost	% Benefit to Existing	Impact Expense	Operating Expense
2016-17	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	5300 West Distribution Line	\$250,869	0.00%	\$250,869	\$0
	Upper Filter Station Replacement	\$1,031,625	55.58%	\$458,290	\$573,335
2017-18	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	740 East and 400 South Distribution Lines	\$231,050	0.00%	\$231,050	\$0
2018-19	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	State Street and 340 South Distribution Lines	\$234,423	0.00%	\$234,423	\$0
2019-20	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Southern Well #1 Connection to PI System	\$2,475,289	0.00%	\$2,475,289	\$0
2020-21	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	860 East Northern Distribution Line	\$222,365	0.00%	\$222,365	\$0
2021-22	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	860 East Southern Distribution Line	\$209,338	0.00%	\$209,338	\$0
2022-23	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	5750 West Distribution Line	\$238,070	0.00%	\$238,070	\$0
2023-24	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	200 South Distribution Line	\$285,846	0.00%	\$285,846	\$0
2024-25	Annual Master Plan Review	\$4,000	55.58%	\$1,777	\$2,223
	Spring Creek Connection to PI System	\$502,616	0.00%	\$502,616	\$0
2025-26	5 Year Master Plan Update	\$40,000	55.58%	\$17,770	\$22,230
	1500 South Distribution Line	\$187,683	0.00%	\$187,683	\$0
Total Expenditures		\$5,793,492		\$5,157,912	\$635,580

Revenue Source to Finance System Improvements

The following revenue sources to finance impact on system improvements are identified in accordance with Utah Code Annotated, 11-36a-302(2).

General Fund Revenues

While general fund revenues can be used to fund capital facilities, they are generally insufficient to meet the demands of large infrastructure projects. General fund revenues are mainly drawn from property, sales, and franchise tax revenues.

Grants and Donations

Grants monies or low interest loans for capital facilities may be available through a variety of state and federal

programs. Competition for these types of funds is often strong, but they should not be overlooked as a potential funding source.

Pressurized Irrigation Utility

Most municipalities have enacted a pressurized irrigation utility to pay the cost of capital facilities. A pressurized irrigation utility would charge all residents a monthly fee based on water usage. Monthly fees could then be used to maintain the system and/or construct capital facility improvements.

Impact Fees

Impact fees are an important means of financing future pressurized irrigation capital facility improvements, especially given the growth American Fork City is experiencing. The fees collected can be used for infrastructure as outlined in this IFFP. Impact fees are a one-time fee charged to new development that allow development to “pay its own way” in terms of the additional costs cities experience when growth occurs. Impact fees must meet the requirements of Utah law, must demonstrate that there is a rational connection between the fees charged to correct deficiencies in an existing system, and must provide that adjustment to impact fees be made to appropriately credit any significant past payments or anticipated future payments to capital facilities. This is to insure that the new development is not “double charged” for capital facilities. Impact fees are necessary in order to achieve an equitable allocation between the costs borne in the past and the cost to be borne in the future. Existing residential and businesses are well served by the existing pressurized irrigation system. However, with additional growth improvements and expansion of the pressurized irrigation system will be needed to provide adequate service.

Debt Financing

American Fork City can also fund pressurized irrigation facilities through bonding. Bonding is often a good approach when large sums are needed up-front because it allows the payments to be spread over a longer time period. American Fork City does have a revenue source in pressurized irrigation user rates to back a debt service payment for pressurized irrigation system improvements. Bonding can be obtained on the open market or through governmental agencies such as the Utah Division of Drinking Water.

IFFP Certification

I certify that the attached impact fee facility plan (IFFP):

1. includes only the costs of public facilities that are:
 - a. allowed under the Impact Fees Act; and
 - b. actually incurred; or
 - c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;
2. does not include:
 - a. costs of operation and maintenance of public facilities;
 - b. costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents;
 - c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and
3. offset costs with grants or other alternate sources of payment; and
4. complies in each and every relevant respect with the Impact Fees Act.

This certification made in accordance with Utah Code Annotated, 11-36a-306(1), with the following caveats:

1. All of the recommendations for implementation of the IFFP made in the IFFP are followed in their entirety by American Fork City staff and Council in accordance to the specific policies established for the service area.
2. If all or a portion of the IFFP are modified or amended, this certification is no longer valid.
3. All information provided to Horrocks Engineers, its contractors or suppliers is assumed to be correct, complete and accurate. This includes information provided by American Fork City and outside sources.

Date _____

John E. Schiess, P.E.
Horrocks Engineers

APPENDIX

Legend

Pipes

Improvements

New 6 Inch

New 8 Inch

New 10 Inch

New 12 Inch

New 14 Inch

New 16 Inch

New 18 Inch

New 24 Inch

New 30 Inch

New 36 Inch

Mitchell Hollow Springs

Spring Creek

Mill Lane Well

Southern Wells

6th East Well

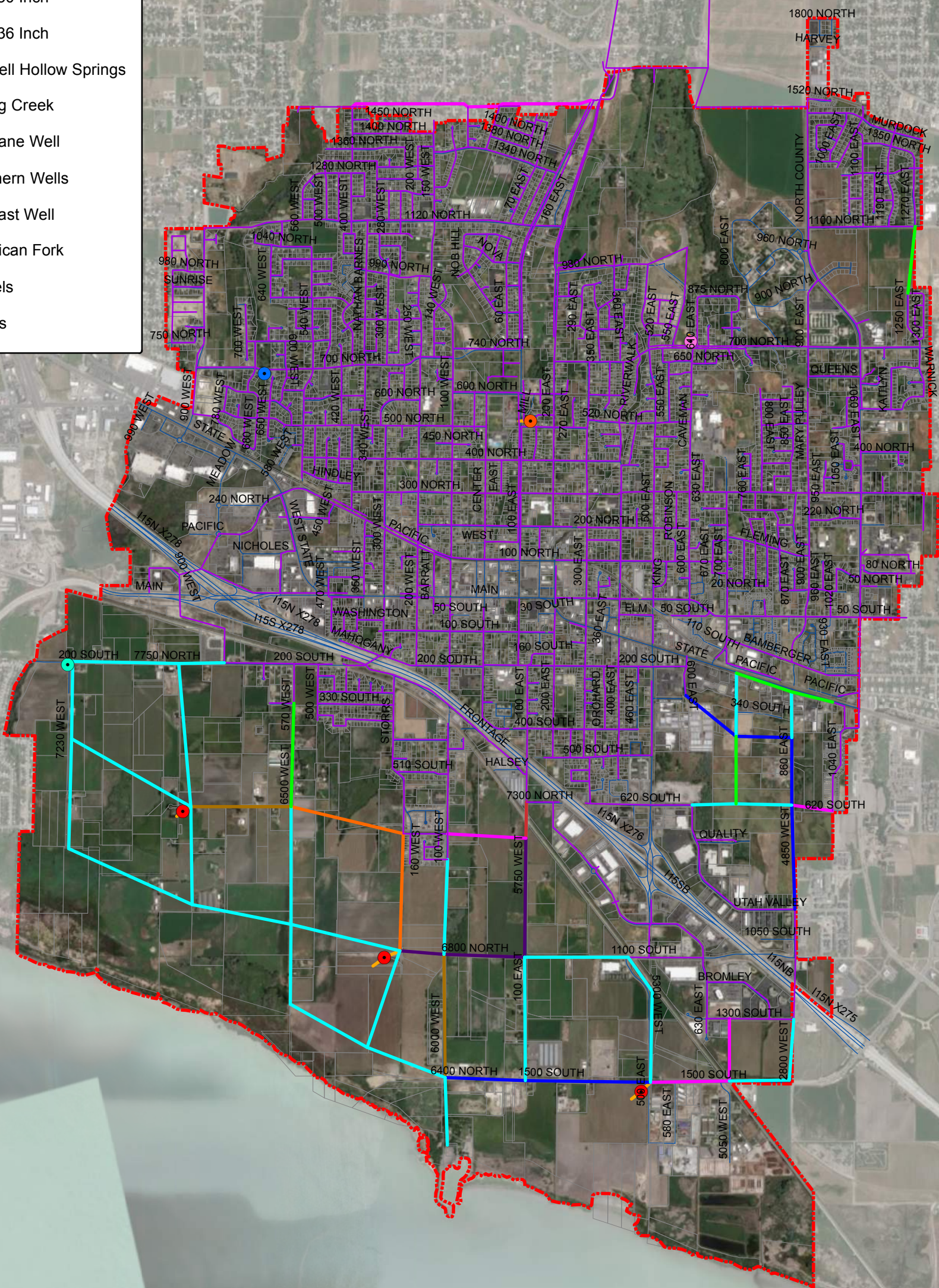
American Fork

Parcels

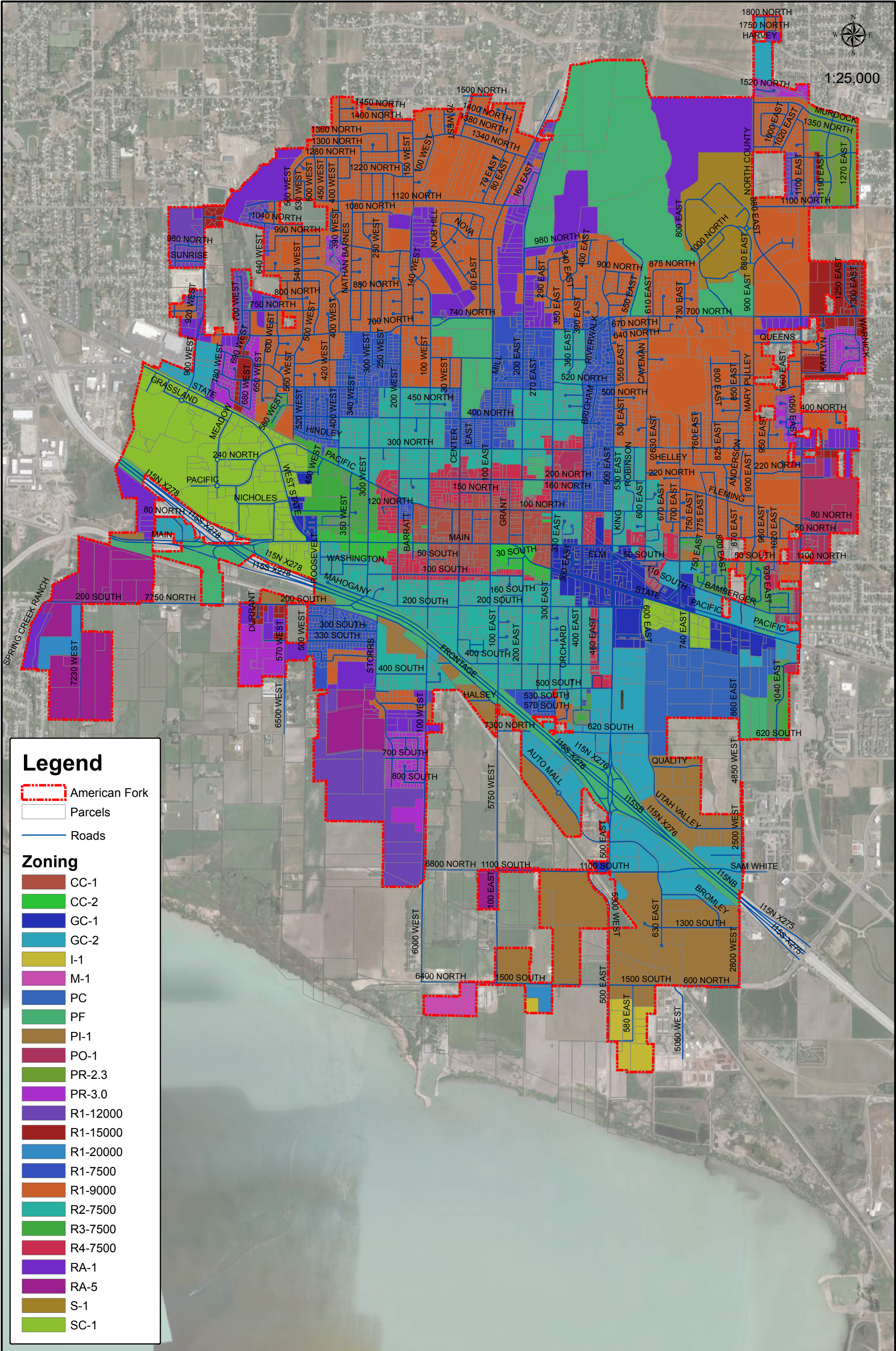
Roads



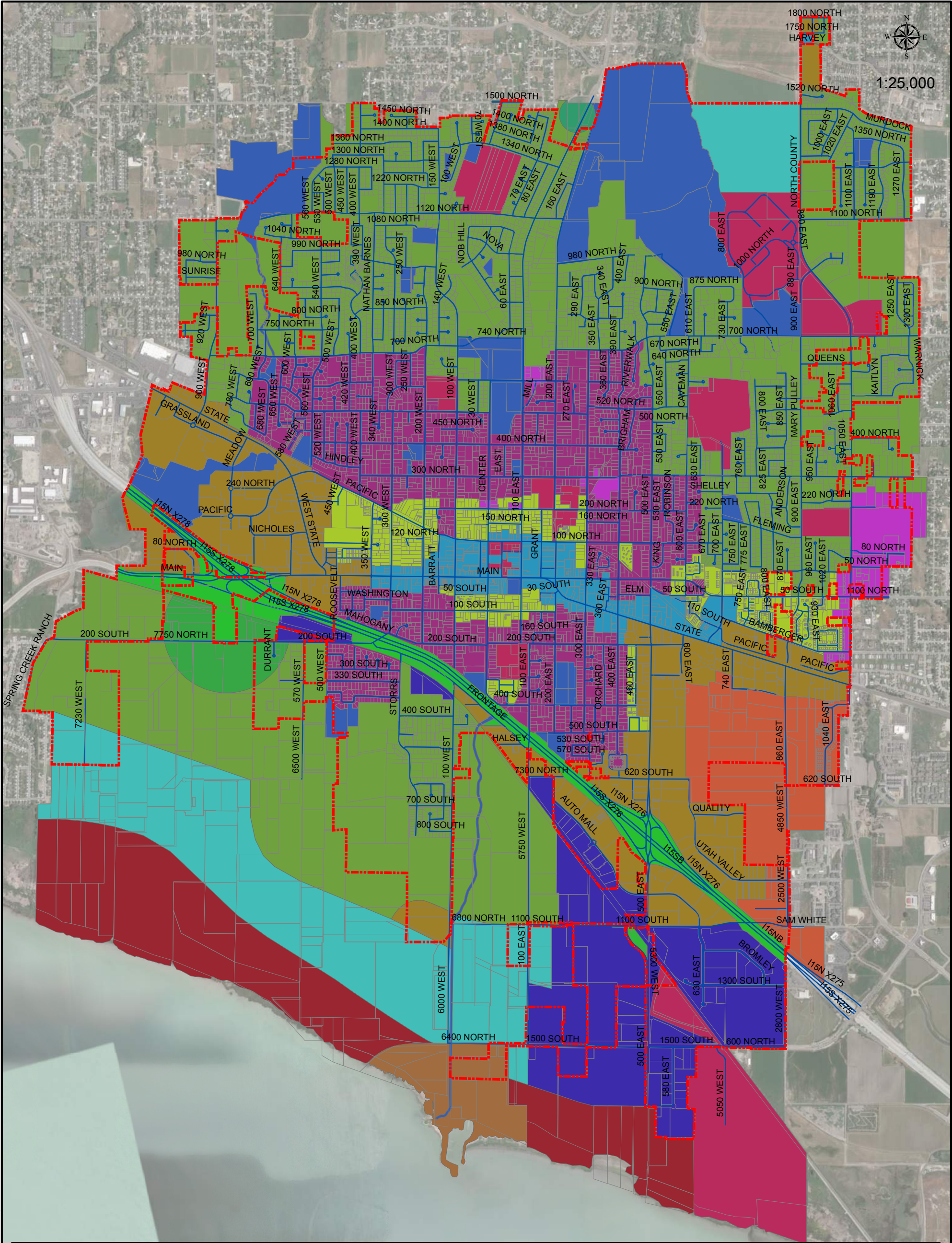
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Legend

Land Use

- | | | | |
|--|---------------------------|-------------------------------|---------------|
| Design Commercial | Neighborhood Commercial | Residential Medium Density | American Fork |
| Design Industrial | Planned Community | Residential Very- Low Density | Parcels |
| General Commercial | Professional Office | Resort | Roads |
| Institutional Lands, Schools and Public Facilities | Public Parks & Open Space | Shoreline Protection | |
| Major Transportation Facilities | Residential High Density | Transit Oriented Development | |
| | Residential Low Density | | |

Legend

- Diameter

16-inch

2-inch

4-inch

6-inch

8-inch

10-inch

12-inch

14-inch
- 18-inch


22-inch


24-inch


30-inch


36-inch


39-inch


42-inch
-  Kelly Pasture Springs


 Upper Reservoir


 Lower Reservoir

 PRV

 Junctions

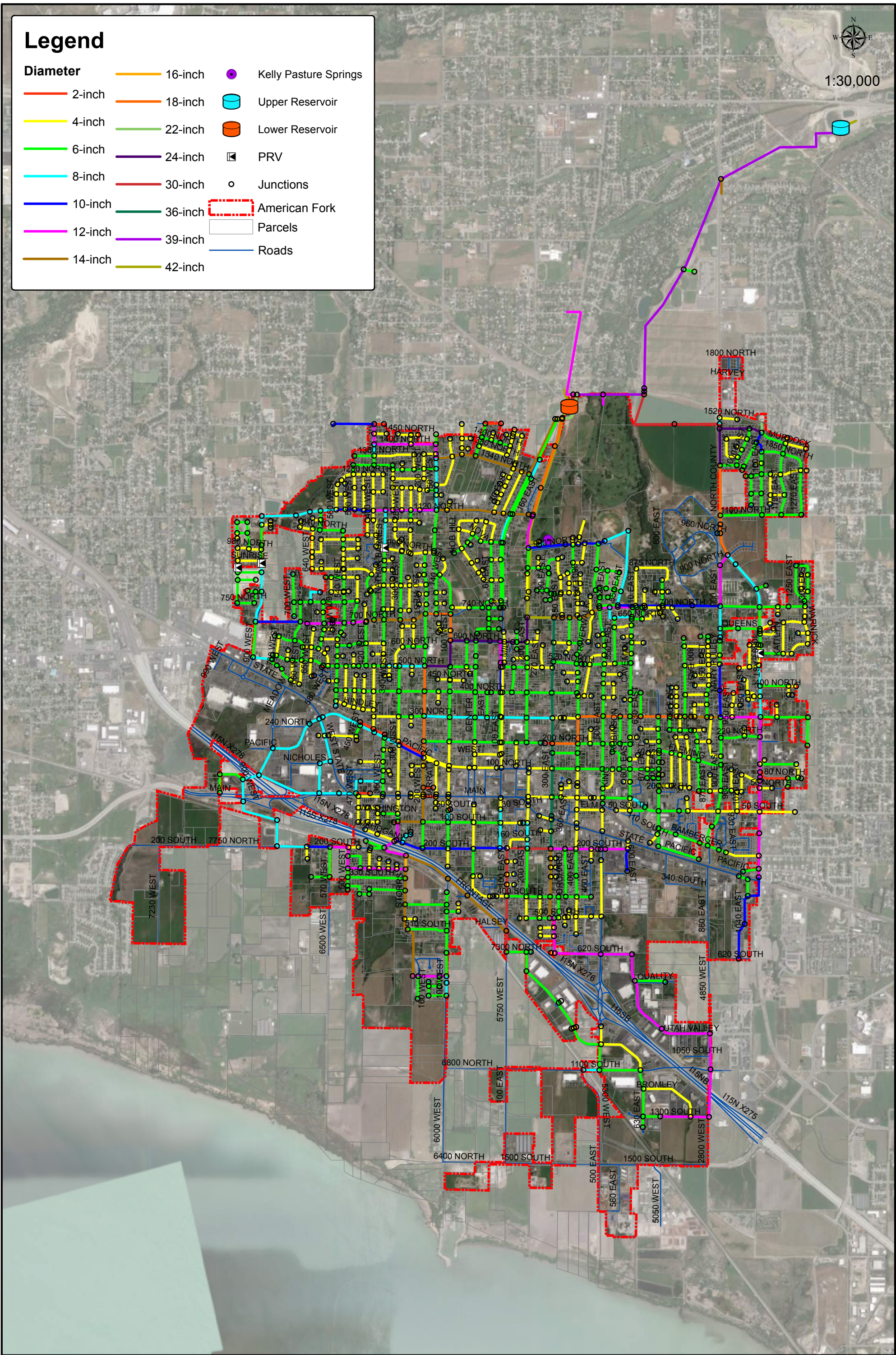
 American Fork

 Parcels

 Roads



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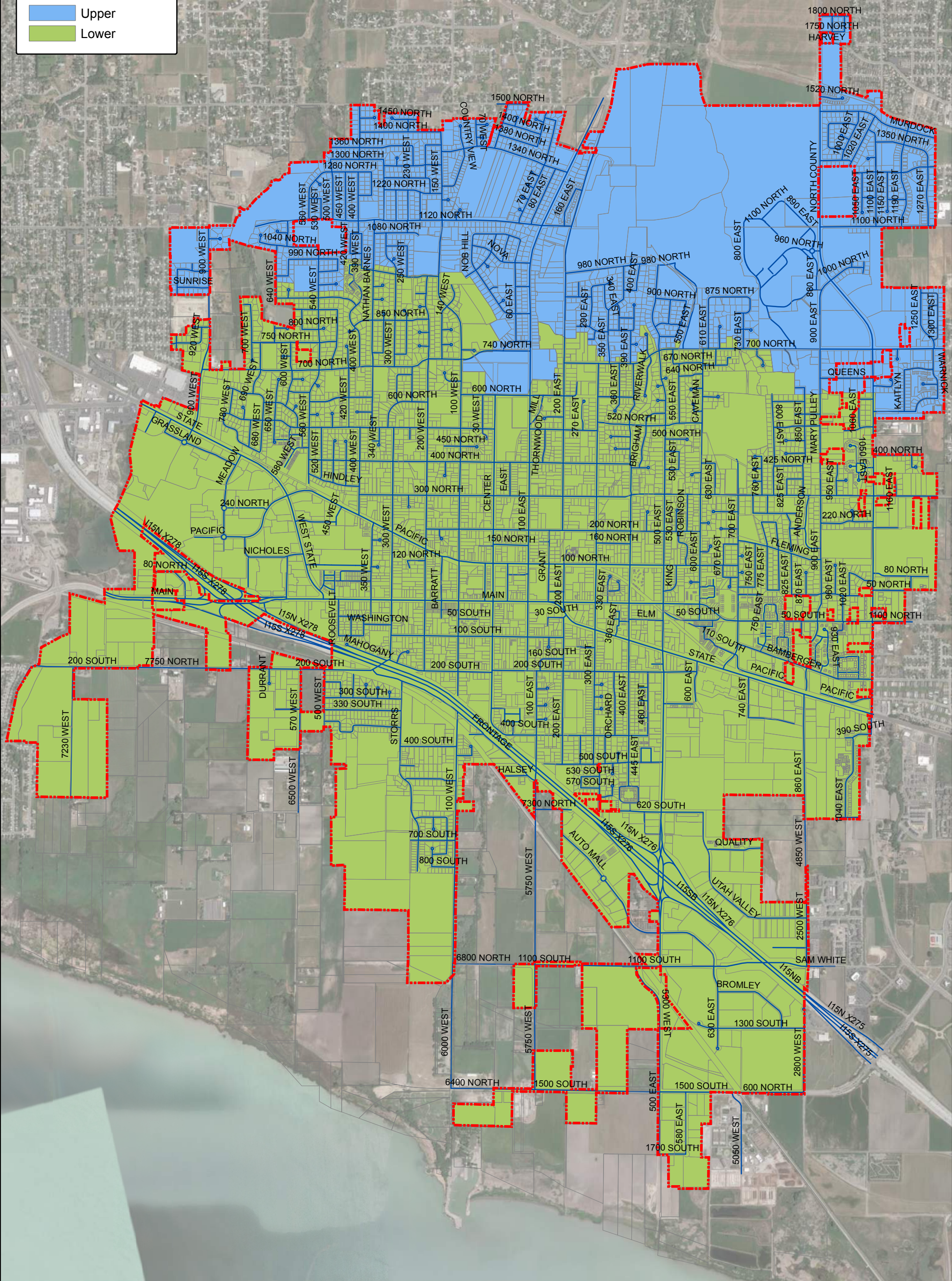
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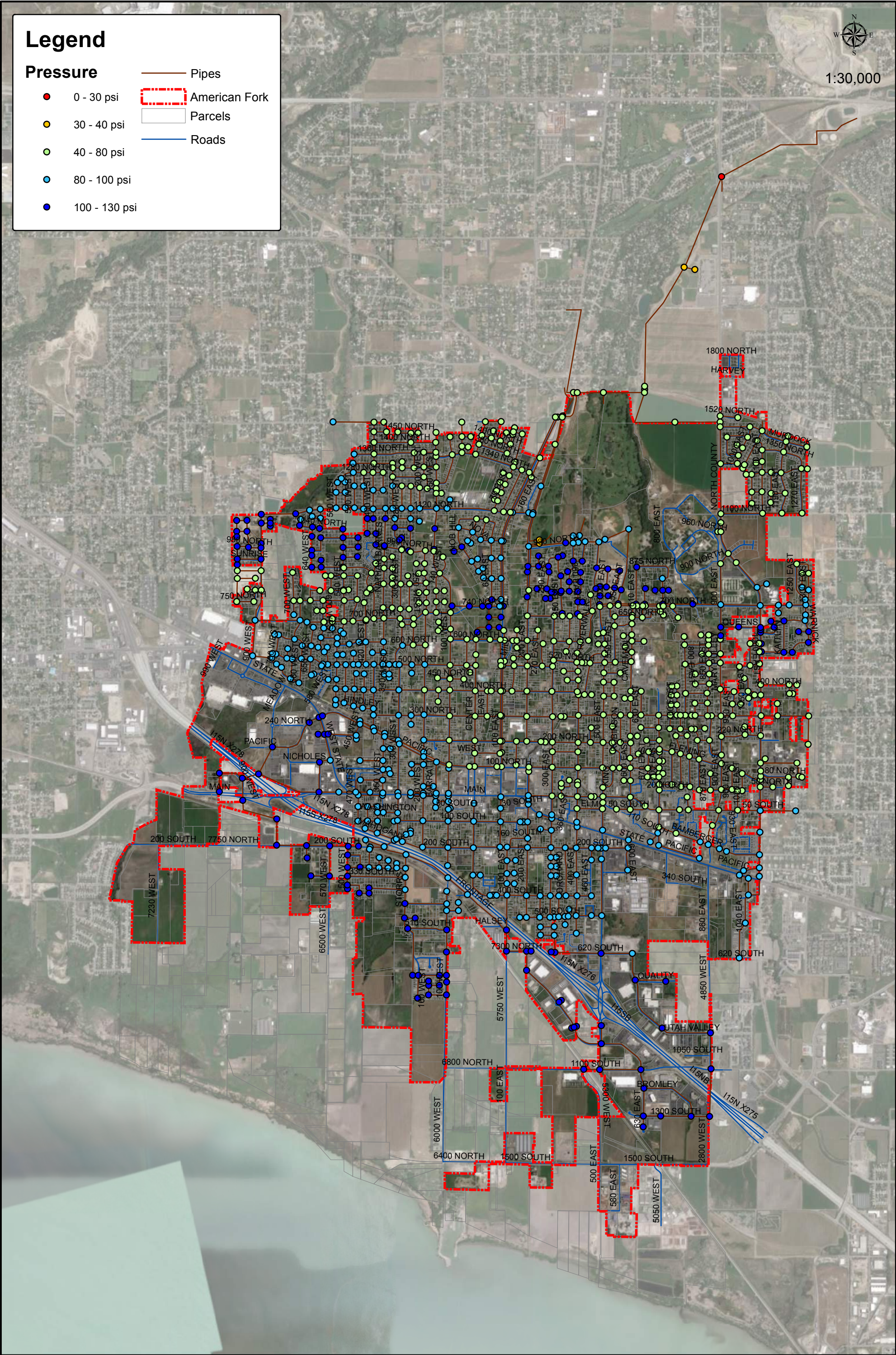
Legend

- American Fork
- Parcels
- Roads
- Pressure Zone
 - Upper
 - Lower

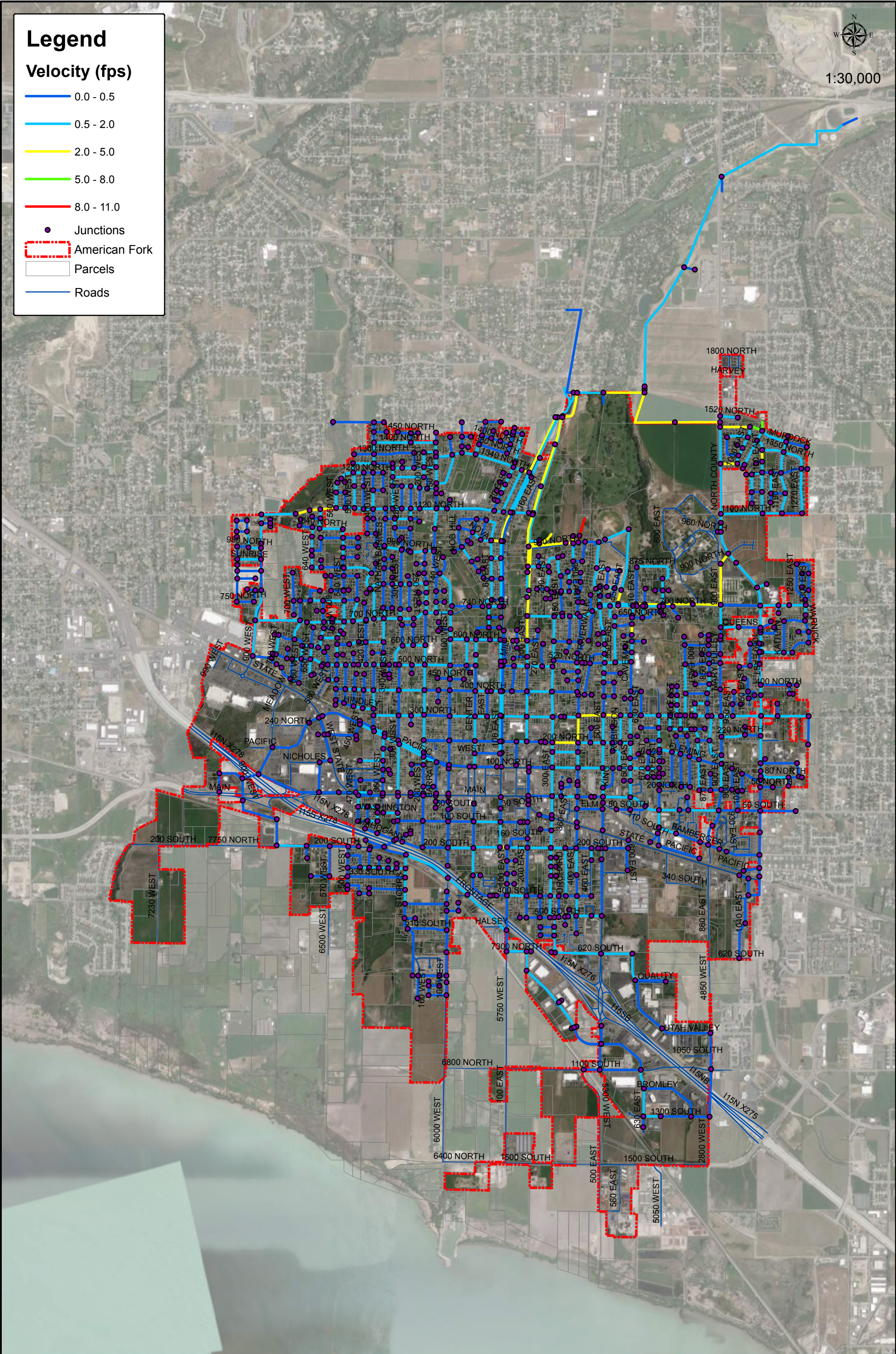


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Legend

- Diameter

2-inch

3-inch

4-inch

6-inch

8-inch

10-inch

12-inch

14-inch

16-inch

18-inch

22-inch

24-inch

30-inch

36-inch

39-inch

42-inch
- Kelly Pasture Springs

●

 Mitchell Hollow Springs

●

 Spring Creek

●

 Mill Lane Well

●

 Southern Wells

●

 6th East Well

●

 Upper Reservoir

●

 Lower Reservoir

□

 PRV
- Junctions

□

 American Fork

□

 Parcels

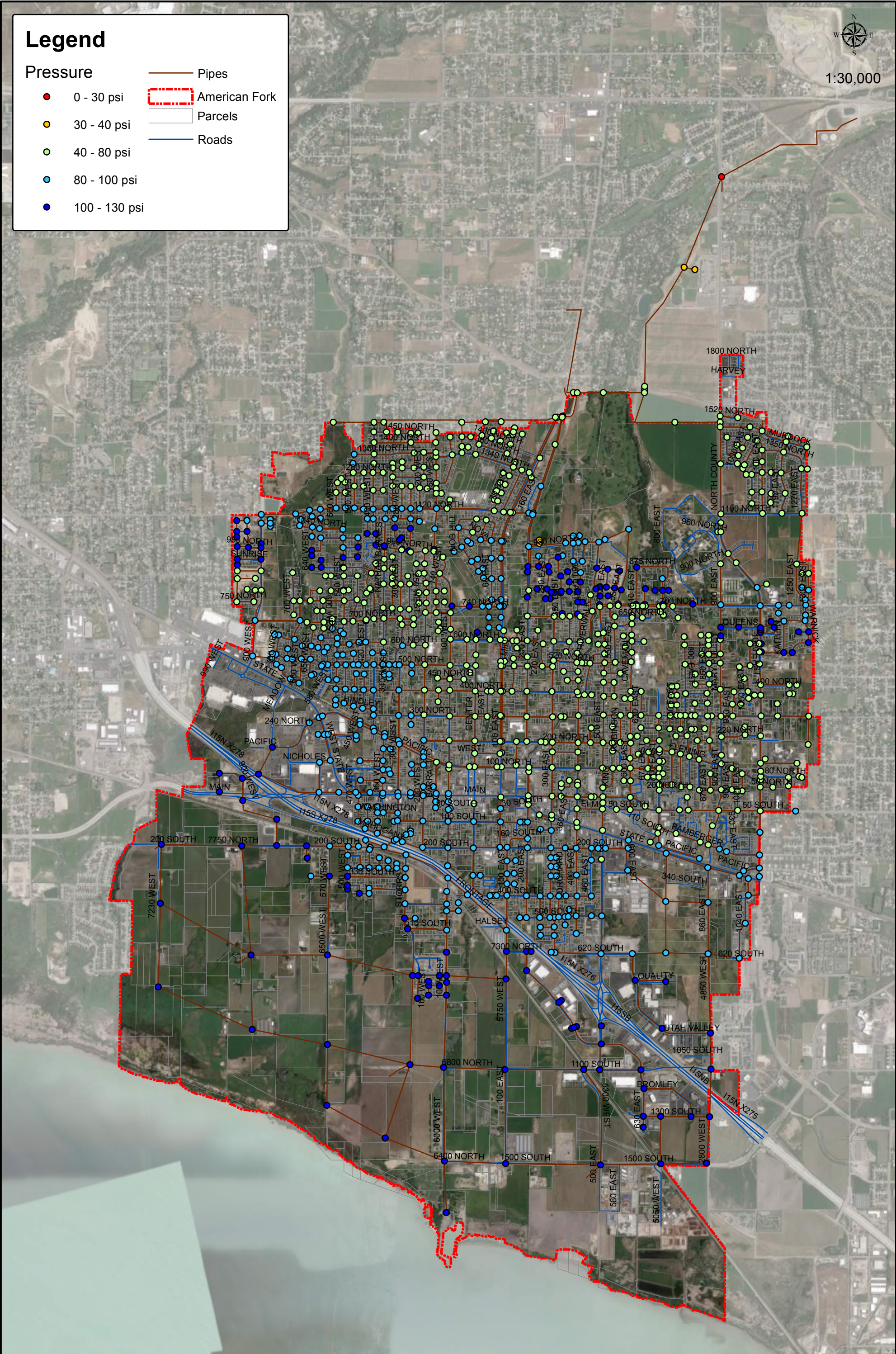
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 Roads



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Legend

Pressure

- 0 - 30 psi
- 30 - 40 psi
- 40 - 80 psi
- 80 - 100 psi
- 100 - 130 psi

- Pipes
- American Fork
- Parcels
- Roads



1:30,000

Table 35 Detailed Cost Estimates

Upper Filter Station Replacement

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	1	LS	----	\$27,250
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	1	EA	\$545,000.00	\$545,000
24	Class "A" Road Repair	0	SF	\$4.00	\$0
25	Imported Backfill	0	TON	\$16.00	\$0
26	Valves and Fittings	0	LS	\$7,045,434.13	\$0
27	Traffic Control	0	LS	\$563,634.73	\$0
28	Utility Relocation	0	LS	\$704,543.41	\$0
Sub Total (Construction)					\$572,250
Contingencies		15%			\$85,838
Total (Construction)					\$658,088
Design and Construction Engineering		15%			\$85,838
Administration, Legal, and Bond Counsel		1%			\$5,723
Total (Professional Services)					\$91,560
Grand Total					\$749,648

Mar 2016 CCI = 10242

Costs are in 2016 dollars

5300 West Distribution Line

Item	Description	Quantity	Units	Unit Cost	Cost	
1	Mobilization	1	LS	----	\$9,119	
2	2 inch Pipe	0	LF	\$17.00	\$0	
3	4 inch Pipe	0	LF	\$19.86	\$0	
4	6 inch Pipe	0	LF	\$24.04	\$0	
5	8 inch Pipe	2,912	LF	\$26.13	\$76,076	
6	10 inch Pipe	0	LF	\$29.26	\$0	
7	12 inch Pipe	0	LF	\$38.67	\$0	
8	14 inch Pipe	0	LF	\$70.02	\$0	
9	16 inch Pipe	0	LF	\$75.24	\$0	
10	18 inch Pipe	0	LF	\$86.74	\$0	
11	22 inch Pipe	0	LF	\$97.00	\$0	
12	24 inch Pipe	0	LF	\$110.00	\$0	
13	30 inch Pipe	0	LF	\$146.30	\$0	
14	36 inch Pipe	0	LF	\$176.00	\$0	
15	39 inch Pipe	0	LF	\$240.00	\$0	
16	42 inch Pipe	0	LF	\$270.00	\$0	
17	Service Connections	0	EA	\$940.00	\$0	
18	Mitchell Hollow	0	EA	\$350,000.00	\$0	
19	Spring Creek	0	EA	\$350,000.00	\$0	
20	Mill Lane Well	0	EA	\$730,000.00	\$0	
21	6th East Well	0	EA	\$1,730,000.00	\$0	
22	Southern Wells	0	EA	\$1,730,000.00	\$0	
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0	
24	Class "A" Road Repair	17,472	SF	\$4.00	\$69,888	
25	Imported Backfill	874	TON	\$16.00	\$13,978	
26	Valves and Fittings	1	LS	\$19,019.00	\$19,019	
27	Traffic Control	1	LS	\$1,521.52	\$1,522	
28	Utility Relocation	1	LS	\$1,901.90	\$1,902	
Sub Total (Construction)					\$191,503	
Contingencies					15%	\$28,725
Total (Construction)						\$220,229
Design and Construction Engineering					15%	\$28,725
Administration, Legal, and Bond Counsel					1%	\$1,915
Total (Professional Services)						\$30,641
Grand Total						\$250,869

Mar 2016 CCI = 10242

Costs are in 2016 dollars

740 East and 400 South Distribution Lines

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	0	LS	----	\$8,399
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	1,385	LF	\$26.13	\$36,183
6	10 inch Pipe	1,218	LF	\$29.26	\$35,639
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	15,618	SF	\$4.00	\$62,472
25	Imported Backfill	781	TON	\$16.00	\$12,494
26	Valves and Fittings	1	LS	\$17,955.45	\$17,955
27	Traffic Control	1	LS	\$1,436.44	\$1,436
28	Utility Relocation	1	LS	\$1,795.55	\$1,796
Sub Total (Construction)					\$176,374
Contingencies					15% \$26,456
Total (Construction)					\$202,831
Design and Construction Engineering					15% \$26,456
Administration, Legal, and Bond Counsel					1% \$1,764
Total (Professional Services)					\$28,220
Grand Total					\$231,050

Mar 2016 CCI = 10242

Costs are in 2016 dollars

State Street and 340 South Distribution Lines

Item	Description	Quantity	Units	Unit Cost	Cost	
1	Mobilization	0	LS	----	\$8,521	
2	2 inch Pipe	0	LF	\$17.00	\$0	
3	4 inch Pipe	0	LF	\$19.86	\$0	
4	6 inch Pipe	1,267	LF	\$24.04	\$30,452	
5	8 inch Pipe	0	LF	\$26.13	\$0	
6	10 inch Pipe	1,417	LF	\$29.26	\$41,461	
7	12 inch Pipe	0	LF	\$38.67	\$0	
8	14 inch Pipe	0	LF	\$70.02	\$0	
9	16 inch Pipe	0	LF	\$75.24	\$0	
10	18 inch Pipe	0	LF	\$86.74	\$0	
11	22 inch Pipe	0	LF	\$97.00	\$0	
12	24 inch Pipe	0	LF	\$110.00	\$0	
13	30 inch Pipe	0	LF	\$146.30	\$0	
14	36 inch Pipe	0	LF	\$176.00	\$0	
15	39 inch Pipe	0	LF	\$240.00	\$0	
16	42 inch Pipe	0	LF	\$270.00	\$0	
17	Service Connections	0	EA	\$940.00	\$0	
18	Mitchell Hollow	0	EA	\$350,000.00	\$0	
19	Spring Creek	0	EA	\$350,000.00	\$0	
20	Mill Lane Well	0	EA	\$730,000.00	\$0	
21	6th East Well	0	EA	\$1,730,000.00	\$0	
22	Southern Wells	0	EA	\$1,730,000.00	\$0	
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0	
24	Class "A" Road Repair	16,104	SF	\$4.00	\$64,416	
25	Imported Backfill	805	TON	\$16.00	\$12,883	
26	Valves and Fittings	1	LS	\$17,978.44	\$17,978	
27	Traffic Control	1	LS	\$1,438.28	\$1,438	
28	Utility Relocation	1	LS	\$1,797.84	\$1,798	
Sub Total (Construction)					\$178,949	
Contingencies					15%	\$26,842
Total (Construction)					\$205,791	
Design and Construction Engineering					15%	\$26,842
Administration, Legal, and Bond Counsel					1%	\$1,789
Total (Professional Services)					\$28,632	
Grand Total					\$234,423	

Mar 2016 CCI = 10242

Costs are in 2016 dollars

Southern Well #1 Connection to PI System

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	0	LS	----	\$89,978
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	551	LF	\$75.24	\$41,457
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
22	Southern Wells	1	EA	\$1,730,000.00	\$1,730,000
24	Class "A" Road Repair	3,306	SF	\$4.00	\$13,224
25	Imported Backfill	165	TON	\$16.00	\$2,645
26	Valves and Fittings	1	LS	\$10,364.31	\$10,364
27	Traffic Control	1	LS	\$829.14	\$829
28	Utility Relocation	1	LS	\$1,036.43	\$1,036
Sub Total (Construction)					\$1,889,534
Contingencies					15%
Total (Construction)					\$2,172,964
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$302,325
Grand Total					\$2,475,289

Mar 2016 CCI = 10242

Costs are in 2016 dollars

860 East Northern Distribution Line

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	0	LS	----	\$8,083
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	1,002	LF	\$26.13	\$26,177
6	10 inch Pipe	1,483	LF	\$29.26	\$43,393
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	14,910	SF	\$4.00	\$59,640
25	Imported Backfill	746	TON	\$16.00	\$11,928
26	Valves and Fittings	1	LS	\$17,392.46	\$17,392
27	Traffic Control	1	LS	\$1,391.40	\$1,391
28	Utility Relocation	1	LS	\$1,739.25	\$1,739
Sub Total (Construction)					\$169,744
Contingencies					15%
Total (Construction)					\$25,462
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$1,697
Grand Total					\$27,159
Grand Total					\$222,365

Mar 2016 CCI = 10242

Costs are in 2016 dollars

860 East Southern Distribution Line

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	0	LS	----	\$7,610
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	2,282	LF	\$29.26	\$66,771
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	13,692	SF	\$4.00	\$54,768
25	Imported Backfill	685	TON	\$16.00	\$10,954
26	Valves and Fittings	1	LS	\$16,692.83	\$16,693
27	Traffic Control	1	LS	\$1,335.43	\$1,335
28	Utility Relocation	1	LS	\$1,669.28	\$1,669
Sub Total (Construction)					\$159,800
Contingencies					15%
Total (Construction)					\$183,770
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$25,568
Grand Total					\$209,338

Mar 2016 CCI = 10242

Costs are in 2016 dollars

5750 West Distribution Line

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	0	LS	----	\$8,654
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	793	LF	\$146.30	\$116,016
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	4,758	SF	\$4.00	\$19,032
25	Imported Backfill	238	TON	\$16.00	\$3,806
26	Valves and Fittings	1	LS	\$29,003.98	\$29,004
27	Traffic Control	1	LS	\$2,320.32	\$2,320
28	Utility Relocation	1	LS	\$2,900.40	\$2,900
Sub Total (Construction)					\$181,733
Contingencies					15% \$27,260
Total (Construction)					\$208,993
Design and Construction Engineering					15% \$27,260
Administration, Legal, and Bond Counsel					1% \$1,817
Total (Professional Services)					\$29,077
Grand Total					\$238,070

Mar 2016 CCI = 10242

Costs are in 2016 dollars

200 South Distribution Line

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	0	LS	----	\$10,391
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	3,318	LF	\$26.13	\$86,683
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	19,908	SF	\$4.00	\$79,632
25	Imported Backfill	995	TON	\$16.00	\$15,926
26	Valves and Fittings	1	LS	\$21,670.69	\$21,671
27	Traffic Control	1	LS	\$1,733.66	\$1,734
28	Utility Relocation	1	LS	\$2,167.07	\$2,167
Sub Total (Construction)					\$218,203
Contingencies					15%
Total (Construction)					\$250,934
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$34,913
Grand Total					\$285,846

Mar 2016 CCI = 10242

Costs are in 2016 dollars

Spring Creek Connection to PI System

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	0	LS	----	\$18,270
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	231	LF	\$29.26	\$6,759
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	1	EA	\$350,000.00	\$350,000
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	1,386	SF	\$4.00	\$5,544
25	Imported Backfill	69	TON	\$16.00	\$1,109
26	Valves and Fittings	1	LS	\$1,689.77	\$1,690
27	Traffic Control	1	LS	\$135.18	\$135
28	Utility Relocation	1	LS	\$168.98	\$169
Sub Total (Construction)					\$383,676
Contingencies					15%
Total (Construction)					\$441,227
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$61,388
Grand Total					\$502,616

Mar 2016 CCI = 10242

Costs are in 2016 dollars

1500 South Distribution Line

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	0	LS	----	\$6,822
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	1,730	LF	\$38.67	\$66,890
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	10,380	SF	\$4.00	\$41,520
25	Imported Backfill	519	TON	\$16.00	\$8,304
26	Valves and Fittings	1	LS	\$16,722.61	\$16,723
27	Traffic Control	1	LS	\$1,337.81	\$1,338
28	Utility Relocation	1	LS	\$1,672.26	\$1,672
Sub Total (Construction)					\$143,269
Contingencies					15%
Total (Construction)					\$164,760
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$22,923
Grand Total					\$187,683

Mar 2016 CCI = 10242

Costs are in 2016 dollars

Combined Distribution Line Projects

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	1	LS	----	\$387,368
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	6,404	LF	\$24.04	\$153,920
5	8 inch Pipe	52,336	LF	\$26.13	\$1,367,278
6	10 inch Pipe	11,133	LF	\$29.26	\$325,752
7	12 inch Pipe	11,012	LF	\$38.67	\$425,779
8	14 inch Pipe	4,893	LF	\$70.02	\$342,583
9	16 inch Pipe	659	LF	\$75.24	\$49,583
10	18 inch Pipe	5,094	LF	\$86.74	\$441,828
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	5,343	LF	\$110.00	\$587,730
13	30 inch Pipe	793	LF	\$146.30	\$116,016
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	586,002	SF	\$4.00	\$2,344,008
25	Imported Backfill	29,300	TON	\$16.00	\$468,802
26	Valves and Fittings	1	LS	\$952,617.31	\$952,617
27	Traffic Control	1	LS	\$76,209.38	\$76,209
28	Utility Relocation	1	LS	\$95,261.73	\$95,262
Sub Total (Construction)					\$8,134,736
Contingencies					15%
Total (Construction)					\$9,354,946
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$1,301,558
Grand Total					\$10,656,504

Mar 2016 CCI = 10242

Costs are in 2016 dollars

Mitchell Hollow Connection to PI System

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	1	LS	----	\$17,854
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	113	LF	\$26.13	\$2,952
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	0	LF	\$75.24	\$0
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	1	EA	\$350,000.00	\$350,000
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	678	SF	\$4.00	\$2,712
25	Imported Backfill	34	TON	\$16.00	\$542
26	Valves and Fittings	1	LS	\$738.03	\$738
27	Traffic Control	1	LS	\$59.04	\$59
28	Utility Relocation	1	LS	\$73.80	\$74
Sub Total (Construction)					\$374,931
Contingencies					15%
Total (Construction)					\$431,171
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$59,989
Grand Total					\$491,160

Mar 2016 CCI = 10242

Costs are in 2016 dollars

Mill Lane Connection to PI System

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	1	LS	----	\$38,603
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	144	LF	\$75.24	\$10,835
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	93	LF	\$176.00	\$16,368
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	1	EA	\$730,000.00	\$730,000
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	0	EA	\$1,730,000.00	\$0
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	1,422	SF	\$4.00	\$5,688
25	Imported Backfill	71	TON	\$16.00	\$1,138
26	Valves and Fittings	1	LS	\$6,800.64	\$6,801
27	Traffic Control	1	LS	\$544.05	\$544
28	Utility Relocation	1	LS	\$680.06	\$680
Sub Total (Construction)					\$810,656
Contingencies					15%
Total (Construction)					\$932,254
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$129,705
Grand Total					\$1,061,959

Mar 2016 CCI = 10242

Costs are in 2016 dollars

6th East Well Connection to PI System

Item	Description	Quantity	Units	Unit Cost	Cost	
1	Mobilization	1	LS	----	\$88,311	
2	2 inch Pipe	0	LF	\$17.00	\$0	
3	4 inch Pipe	0	LF	\$19.86	\$0	
4	6 inch Pipe	0	LF	\$24.04	\$0	
5	8 inch Pipe	0	LF	\$26.13	\$0	
6	10 inch Pipe	0	LF	\$29.26	\$0	
7	12 inch Pipe	0	LF	\$38.67	\$0	
8	14 inch Pipe	0	LF	\$70.02	\$0	
9	16 inch Pipe	287	LF	\$75.24	\$21,594	
10	18 inch Pipe	0	LF	\$86.74	\$0	
11	22 inch Pipe	0	LF	\$97.00	\$0	
12	24 inch Pipe	0	LF	\$110.00	\$0	
13	30 inch Pipe	0	LF	\$146.30	\$0	
14	36 inch Pipe	0	LF	\$176.00	\$0	
15	39 inch Pipe	0	LF	\$240.00	\$0	
16	42 inch Pipe	0	LF	\$270.00	\$0	
17	Service Connections	0	EA	\$940.00	\$0	
18	Mitchell Hollow	0	EA	\$350,000.00	\$0	
19	Spring Creek	0	EA	\$350,000.00	\$0	
20	Mill Lane Well	0	EA	\$730,000.00	\$0	
21	6th East Well	1	EA	\$1,730,000.00	\$1,730,000	
22	Southern Wells	0	EA	\$1,730,000.00	\$0	
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0	
24	Class "A" Road Repair	1,722	SF	\$4.00	\$6,888	
25	Imported Backfill	86	TON	\$16.00	\$1,378	
26	Valves and Fittings	1	LS	\$5,398.47	\$5,398	
27	Traffic Control	1	LS	\$431.88	\$432	
28	Utility Relocation	1	LS	\$539.85	\$540	
Sub Total (Construction)					\$1,854,541	
Contingencies					15%	\$278,181
Total (Construction)					\$2,132,722	
Design and Construction Engineering					15%	\$278,181
Administration, Legal, and Bond Counsel					1%	\$18,545
Total (Professional Services)					\$296,727	
Grand Total					\$2,429,449	

Mar 2016 CCI = 10242

Costs are in 2016 dollars

Southern Well #2 Connection to PI System

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	1	LS	----	\$88,867
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	375	LF	\$75.24	\$28,215
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	1	EA	\$1,730,000.00	\$1,730,000
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	2,250	SF	\$4.00	\$9,000
25	Imported Backfill	113	TON	\$16.00	\$1,800
26	Valves and Fittings	1	LS	\$7,053.75	\$7,054
27	Traffic Control	1	LS	\$564.30	\$564
28	Utility Relocation	1	LS	\$705.38	\$705
Sub Total (Construction)					\$1,866,205
Contingencies					15%
Total (Construction)					\$2,146,136
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$298,593
Grand Total					\$2,444,729

Mar 2016 CCI = 10242

Costs are in 2016 dollars

Southern Well #3 Connection to PI System

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization	1	LS	----	\$90,779
2	2 inch Pipe	0	LF	\$17.00	\$0
3	4 inch Pipe	0	LF	\$19.86	\$0
4	6 inch Pipe	0	LF	\$24.04	\$0
5	8 inch Pipe	0	LF	\$26.13	\$0
6	10 inch Pipe	0	LF	\$29.26	\$0
7	12 inch Pipe	0	LF	\$38.67	\$0
8	14 inch Pipe	0	LF	\$70.02	\$0
9	16 inch Pipe	678	LF	\$75.24	\$51,013
10	18 inch Pipe	0	LF	\$86.74	\$0
11	22 inch Pipe	0	LF	\$97.00	\$0
12	24 inch Pipe	0	LF	\$110.00	\$0
13	30 inch Pipe	0	LF	\$146.30	\$0
14	36 inch Pipe	0	LF	\$176.00	\$0
15	39 inch Pipe	0	LF	\$240.00	\$0
16	42 inch Pipe	0	LF	\$270.00	\$0
17	Service Connections	0	EA	\$940.00	\$0
18	Mitchell Hollow	0	EA	\$350,000.00	\$0
19	Spring Creek	0	EA	\$350,000.00	\$0
20	Mill Lane Well	0	EA	\$730,000.00	\$0
21	6th East Well	0	EA	\$1,730,000.00	\$0
22	Southern Wells	1	EA	\$1,730,000.00	\$1,730,000
23	Upper Filter Station Replacement	0	EA	\$545,000.00	\$0
24	Class "A" Road Repair	4,068	SF	\$4.00	\$16,272
25	Imported Backfill	203	TON	\$16.00	\$3,254
26	Valves and Fittings	1	LS	\$12,753.18	\$12,753
27	Traffic Control	1	LS	\$1,020.25	\$1,020
28	Utility Relocation	1	LS	\$1,275.32	\$1,275
Sub Total (Construction)					\$1,906,367
Contingencies					15%
Total (Construction)					\$2,192,322
Design and Construction Engineering					15%
Administration, Legal, and Bond Counsel					1%
Total (Professional Services)					\$305,019
Grand Total					\$2,497,341

Mar 2016 CCI = 10242

Costs are in 2016 dollars